

STATEMENT OF DR. GEORGE D. THURSTON, Sc. D.
TO THE
SENATE COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS
SUBCOMMITTEE ON PUBLIC HEALTH

RE: THE USE OF THE NATIONWIDE REGISTRIES TO ASSESS
ENVIRONMENTAL HEALTH EFFECTS

March 6, 2002

Senator Clinton and other members of the Subcommittee, I am George Thurston, a tenured Associate Professor of Environmental Medicine at the New York University (NYU) School of Medicine. My scientific research involves investigations of the human health effects of air pollution.

I am also the Director of the National Institute of Environmental Health Sciences' (NIEHS) Community Outreach and Education Program (COEP) at the NYU Institute of Environmental Medicine. A goal of this program is to provide an impartial scientific resource on environmental health issues to decision-makers, and that is my purpose in speaking to you at this hearing.

Today, I would like to describe an example of how national health outcome registries can and do provide us with opportunities to investigate the underlying causes of disease: a major new NIEHS-funded prospective cohort study that could not have been conducted without the Nationwide Death Index registry. This study, was conducted under the direction of Dr. Arden Pope of Brigham Young University and myself, and it provides the most definitive epidemiologic evidence to date that long-term exposures to ambient air pollution in the U.S. are associated with significant excess human mortality, including cardio-pulmonary deaths and lung cancer deaths (Pope et al., 2002). This new study evaluates the effects of long-term exposure to particulate matter (PM) air pollution on human mortality using death and cause of death data for a large cohort derived from over 100 cities across the U.S. by using the nationwide death certificate data contained in the National Death Index. A key implication of this study is that long-term exposures to fine particle pollution are associated with a 20 percent increase in the public's risk of dying of lung cancer, which is roughly comparable to the lung cancer risk from passive smoke that has been estimated for a non-smoker who lives with a smoker.

In this study, individual risk factor data for some 500,000 adults collected by the American Cancer Society were linked with air pollution data for metropolitan areas

throughout the U.S. Cohort participants were enrolled in 1982 and vital status and cause of death were ascertained through 1998 using the National Death Index. After taking into account other risk factors, such as age, sex, race, smoking, education, marital status, body mass, diet, alcohol consumption, and occupational exposures, the extent to which air pollution was associated with increased risk of death was evaluated. In this manner, the mortality risks of air pollution exposures to sulfate and PM_{2.5} fine particulate matter air pollution, as well as to multiple gaseous air pollutants, were estimated. Particulate matter air pollution is composed of both primary particles, such as soot from diesel vehicles, as well as secondary particles formed in the atmosphere, such as sulfates formed from sulfur dioxide emitted by coal-fired power plants.

An association between mortality and particulate air pollution was observed. Fine particulates, sulfates, and gaseous sulfur oxide-related pollution were associated with all-cause and cardiopulmonary mortality. In addition, each 10 ug/m³ elevation in fine particulate pollution was associated with an 8 percent increase in lung cancer mortality. By contrast, coarse particles and other gaseous pollutants were generally not associated with excess mortality.

This study is a major extension and long-term follow-up analysis of the earlier nationwide American Cancer Society population study by Pope and co-authors (Pope et al, 1995). This new analysis of the ACS cohort substantially expands the prior analysis, including: 1) a more than doubling of the follow-up time to 16 years (and a more than tripling of the number of deaths in the analysis); 2) substantially expanded exposure data set, including gaseous co-pollutant data and new PM_{2.5} data that has been collected in 1999-2001; 3) improved control of occupational exposures; 4) incorporation of dietary variables that account for total fat consumption, as well as consumption of vegetables, citrus and high-fiber grains; and, 5) utilization of the latest advances in statistical modeling.

Overall, this new cohort study confirms and strengthens the previously published ecological and case-control evidence indicating that living in an area that has experienced higher particulate matter air pollution exposures can cause a significant increase in the risk of both cancer and cardio-pulmonary deaths.

This study would not have been practical to conduct without the National Death Index used to determine the fate of participants over time. Without the national death registry, the cost of following up on each of the half-million participants considered in this study would have been onerous, and beyond the budget of NIH research grants that fund much of the basic health research in the U.S.. Thus, this study provides clear-cut evidence of the large advantages of national registries for determining the underlying causes of disease.

In my air pollution research, I have faced situations where my efforts to investigate the role of environmental factors in disease have been stymied by a lack of such a nationwide index for other health outcomes. For example, the keeping of centralized hospital admissions records is highly variable across the nation. In New York, for example, there is the highly comprehensive and accessible Statewide Planning and Research System (SPARCS), which makes such information available to researchers (but only after a stringent review process that assures that patient record privacy will be maintained). This has proved very useful in my research investigating the nature and extent of air pollution effects on the health of New Yorkers. However, when I have tried to access such information in other states, it has sometimes been entirely unavailable on a daily basis, or available in varying forms that are not comparable across states, minimizing the usefulness of such data to conduct powerful national studies. When such health information differs in content and quality across the nation, it makes it more difficult, or impossible, to use for the investigation of the underlying causes of disease. There is clearly a need for a standardization across the states in the way health data are gathered and reported if we are to have the information to evaluate and inter-compare the

environmental and other factors that cause ill health, thereby allowing us as a society to make the best choices as to how to avoid disease and improve the public's health.

In conclusion, I feel that health studies like the ones that I have conducted make clear that there is an important role that the federal government could play in support of such investigations through:

- the establishment of a national network of health and environmental outcome “surveillance” data;
- the development of guidance and the setting of minimum standards for states to use in their data collection, and;
- the providing of further tools and resources the states need to gather and report health and environmental data in a more useful and effective manner.

REFERENCES

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